



Golden Hills

Orthopedic and Sports Physical Therapy

j o u r n a l

november 2008
december



Our Mission...

To further the prevention, diagnosis and treatment of movement dysfunction in order to enhance the physical health and functional abilities of our patients.

To maximize the patient's potential for regaining full physical health by providing rehabilitation through the use of advancements in physical therapy techniques and state-of-the-art equipment.

To establish a self-management program for the patient through education and a personalized home exercise program for each individual to enable the patient to maintain their physical health at home and at work.

Seasonal Activity Spotlight: Ice Hockey

While the popularity of ice hockey in the U.S. doesn't quite match the sport's popularity in countries like Canada (where it was purportedly conceived), the sport is steadily gaining in popularity among American fans and players. In fact, reports show that there are approximately 500,000 hockey players in the U.S., with professional teams, amateur leagues and youth programs tapping into a growing base of people who are drawn to the sport's fast pace and explosive action.

Continuing our focus on seasonal sports, recreation and exercise (SRE) activities, the November-December issue of *Golden Hills Journal* delves into ice hockey, including strategies for injury prevention, the most common causes of injury and Golden Hills' approach to treating patients. Our goal is to help you and your patients understand the risks inherent in this popular winter sport as well as the wide range of physical therapy services available to them.

We welcome referrals of patients who have suffered an ice hockey-related injury or who are simply looking to enhance their performance through effective training and safety practices. Just contact us at **(408) 274-0888**, or **therapy@goldenhillspt.com**. We're here to help!

Ice Hockey: An Overview

Just think about ice hockey for a moment and images of jarring hip-checks, violent brawls and toothless hockey players are likely to come to mind. Hockey's reputation for being an intensely physical contact sport with a high potential for player injury—not to mention its official designation as a "collision sport" by the American Academy of Pediatrics—is well deserved. Players risk injury from high-impact collisions with each other, the rigid boards that mark the boundary of the playing surface and the goal posts. Skate blades, swinging sticks and flying pucks only add to the risk.

While statistics on ice hockey-related injuries aren't as readily available as statistics for other sports played in the U.S., several studies have reported an injury rate of approximately 100 injuries per 1,000 game hours. By comparison, football has an injury rate of 400-500 injuries per 1,000 game hours, so hockey can be said to be somewhat safer than its turf-based counterpart.

Ice Hockey-Related Injuries

Ice hockey has tremendous potential for injury due to the velocities of players, pucks and sticks. Studies conducted worldwide have shown that the rate of

injury increases as the size and the speed of players increase, as well as when body checking (the use of shoulders and hips to slow the progress of a player in control of the puck) is allowed. In fact, the injury rate for leagues that allow checking is about four times higher than the rate for leagues that prohibit such player-to-player contact.

A prominent study investigating the characteristics of ice hockey-related injuries was published in 2004 by the Journal of the American Academy of Pediatrics (JAAP).

The study draws on data from the National Electronic Injury Surveillance System (NEISS), which is one of the most reliable sources for information on the number of emergency room visits that are associated with sports activity, equipment and apparel. The 2004 JAAP study focused on ice hockey-related injuries treated in U.S. emergency departments between January 1, 2001, and December 31, 2002.

During the years studied, an estimated 32,750 individuals with ice hockey-related injuries were treated in U.S. emergency departments, including more than 18,000 youths under the age of 18. The number of injuries peaked through adolescence (ages 12-17), representing 47% of all injuries. Males experienced 90% of all injuries. A very small percentage of individuals were hospitalized after injury (1.2% of individuals under 18 years old and 0.5% of individuals 18 years old or older), although youths under 18 years old had twice the rate of hospitalization after injury than those 18 years old or older.

Common Injury Mechanisms

Considering the following facts, it's no wonder that hockey has a relatively high injury rate: 1) ice is much harder than dirt or turf surfaces; 2) hockey rinks are usually enclosed by rigid wood, metal or plexiglass boundaries; 3) players wear bladed skates, skate at 20-30 mph and use long sticks to control the puck; and 4) a good slapshot can send the hard, vulcanized rubber puck hurtling through the air at speeds well over 100 mph, potentially generating more than 1,200 pounds of impact force.

The following are the most common mechanisms of injury in ice hockey, listed in order of frequency:

- Collision with other players: 24%
- Collision into the boards: 22%
- Stick-related injuries: 18 %
- Struck by the puck: 11%
- Training drills: 8%
- Collision with the ice/goal: 4%
- Struck by a skate: 3%
- Fighting: 3%
- Stretching: 1%
- Running: 3%
- Weightlifting: 1%

According to National Collegiate Athletic Association (NCAA) Injury Surveillance System (ISS) data, hockey injuries are twice as likely to occur during games as during practices. About 25% of recorded injuries are recurrences or complications of prior injuries and the remaining 75% are new injuries. Nearly 70% of all injuries are contact injuries, the majority of which are due to contact with another player.

Body checking is the most commonly reported cause of injury

To Body Check or Not to Body Check

Below are comparative statistics on the increased likelihood of injury with player-to-player contact:

- There are 4 times as many reported injuries in contact versus non-contact leagues
- The body check is one of the most commonly reported causes of both soft tissue and severe trauma injuries (42%), followed by contact with a hockey stick (16%)
- A study on youth hockey players (9-15 years old) showed that body checking accounted for 86% of game-time injuries; 23% of these were head or neck injuries
- Another study, comparing pee-wee level leagues (12-13 years) found that players in the league that allowed body checking had a fracture rate 12 times higher than the players in the league without body checking

and is associated with the more severe injuries. Many of the players injured by body checking collide with goal posts and the boards. Contact between opponents, usually in the form of body checking, is associated with 46% of all minor injuries and 75% of major injuries.

It is estimated that direct trauma (a sudden forceful injury) accounts for 80% of all injuries. Again, most of these injuries are caused by player contact (checking and collision), falls and contact with a puck, stick or skate blade.

Common Injury Types

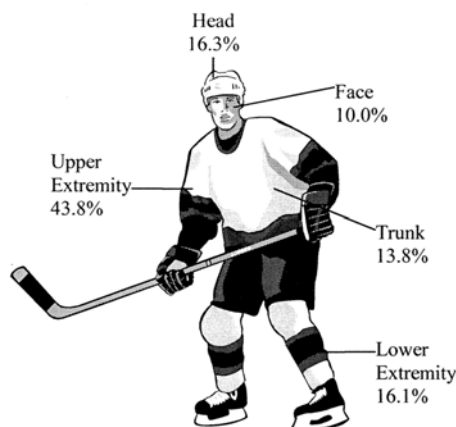
In terms of general injury types, lacerations, contusions and

abrasions account for nearly half of all injuries reported in U.S. emergency departments. Players 18 years old and above have significantly more lacerations than younger players (38% of injuries for 18- to 24-year-olds, 25% for 25- to 34-year-olds and 50% for 35- to 44-year-olds compared with 19% for 6- to 11-year-olds and 14% for 12- to 17-year-olds). Strains, sprains and fractures are also quite common in ice hockey.

Interestingly, the vast major of serious hockey-related injuries are acute in nature, as opposed to chronic, overuse type injuries.

Commonly Injured Body Systems and Parts

Injuries to the upper extremities (upper arm, shoulder, elbow, lower arm, wrist, hand and finger) account for 44% of all injuries, the highest total percentage of body regions injured for youths under 18 years old. Lower extremity injuries (upper leg, knee, lower leg, ankle, foot and toe) and head injuries share about the same rate of injury at roughly 16% each. Interestingly, the incidence of head injuries increases as age decreases, although the trend is not statistically significant. Trunk injuries (neck, upper trunk, lower trunk and pubic region) account for 14% of injuries.



Upper Extremities: Shoulder, Clavicle, Elbow, Hand and Wrist Injuries
 Acromioclavicular (AC) separations are among the most common injuries sustained by postadolescent and adult hockey players. In an NHL locker room, finding players with two normal AC joints is the exception rather than the rule. Clavicular fractures are more common than ligamentous disruptions among younger players, although the inverse is true among players 18 years old and older.

Shoulder (glenohumeral) dislocations and subluxations are also common in ice hockey, but they are an infrequent cause of missed player days.

Other upper extremity injuries are less common but nonetheless can prove debilitating for the hockey player. Sternoclavicular injuries are often sustained when players hit the boards chest-fist while experiencing a sudden retraction of the shoulders from a hit to the back. Apart from simple contusions and impact injuries to the elbow, the more common significant afflictions are olecranon bursitis and hyperextension and/or valgus injuries to the capsule. Either may be caused by falls on the ice or elbow-first collisions into the boards. Leveraged forces through the player's stick can also cause capsular injuries.

Hand and wrist injuries are too numerous to cover completely in this article. Fractures of the metacarpals occur from slashes and fisticuffs. Carpal fractures and dislocations derive from falls on the flexed or extended wrist. Perhaps the most traditional hand injury in hockey is the "gamekeeper's thumb," which can derive from fighting but also from falling with

stick in hand, whereby the stick imparts a radically directed force that ruptures the ulnar collateral ligament of the metacarpophalangeal joint. A unique aspect of hockey is that gloves normally protect the hands from injury, but when fighting occurs and the protective gloves are removed, the hands become exposed to injury. These injuries include fractures, torn tendons or even bite wounds from striking an opposing player's teeth.

Lower Extremities: Knee, Ankle and Foot Injuries

Hockey players sustain the full gamut of knee injuries, ranging from torn menisci to torn cruciate and collateral and capsular ligaments. These are almost always caused by collision, as opposed to turf sports like football and soccer that have greater degrees of foot fixation (as with cleats).

Ankle sprains are infrequent in ice hockey by virtue of the rigidity of the skate boot. However, entrapment of the skate blade by the ice or against the boards, as the pronated ankle is abducted and externally rotated by the player's inertia, can sometimes produce a low grade syndesmosis rupture. Fractures of the ankle are relatively uncommon but bursal enlargements over the malleoli, which have been repeatedly impacted by pucks, are common.

Foot fractures are more common than ankle fractures, again almost invariably due to impact by the puck. The most commonly fractured bone is the navicular. If nondisplaced, players will often play through the pain.

Prevention of Hockey Injuries

The following simple guide can help your patients understand their risks and avoid injury:

Warm Up

Warm up should raise the heart rate, thereby increasing the flow of blood around the body and preparing the athlete for more strenuous activity. Warm up should also warm and stretch the muscles to ensure optimal performance.

A warm-up should consist of a minimum of 5 minutes of cardiovascular exercise followed by dynamic stretches, which should be performed for a minimum of 5 minutes and up to a maximum of 20 minutes.

Protective Equipment

Wearing the right kind of protective equipment is vital to avoid injury in ice hockey.

Rest

Physiological changes within the cardiovascular, respiratory and muscular systems occur when the body is at rest. Overtraining often results in fatigue, which may lead to poor technique and ultimately cause overuse injuries. If the patient feels unwell or exhibits fatigue or pain, he or she should rest until recovered.

Nutrition and Hydration

A balanced diet includes:

- Carbohydrate for refueling muscles
- Protein to rebuild muscles
- Proper hydration
- Vitamins and minerals, which keep the body functioning properly and aid in recovery

A biomechanical analysis by a trained physical therapist can help identify possible weak areas and injury risks.

Soft Tissue Injuries

The incidence of strains in hockey is fairly high, with the predominant strain being in the groin or adductor pull. Unfortunately, there is a significant pattern of a routine groin pull progressing into a chronic and recalcitrant disability.

Symptoms progress proximally toward the pubis and thus more proximally to the lower abdominal wall. The groin is particularly susceptible to strain because the groin muscles are critical force generators for the power starts seen in ice hockey.

With the high rate of collisions in ice hockey, hematomas are also quite common, despite the use of protective pads over the predilected sites. The two most characteristic and disability-producing sites are the anterior or lateral thigh (Charley horse) and about the iliac crest (hip pointer).

Physical Therapy Approach

When an ice-hockey-related injury occurs, Golden Hills' physical therapists are prepared to help your patients heal from the injury and recover their pre-injury levels of performance, including strength, flexibility, balance and endurance.

In past issues of *Golden Hills Journal*, we have discussed in depth our treatment approach for injuries to specific joints or biomechanical systems. Our September-October 2008 issue on football discusses many of the injury conditions listed here in more detail. In addition, the following table shows body systems that are discussed in other past issues. Please access these issues on

our new website at www.goldenhillspt.com/golden_hills_journal, or contact us by phone or email and we will mail you a copy.

Biomechanical System	Discussed in Issue
Shoulder	Aug-Sep 2006
Elbow	Oct-Nov 2006
Hand/Wrist	Jan-Feb 2007
Knee	Jun-Jul 2006
Foot/Ankle	Mar-Apr 2007

Golden Hills' skilled physical therapists are committed to working closely with you, the patient and the patient's coach to help the patient achieve his or her recovery goals and return safely to a regular training program.

Just contact us today for more information at (408) 274-0888, or therapy@goldenhillspt.com.

Physical Therapy at Your Fingertips

We'd like to invite you to visit our brand new website at www.goldenhillspt.com.



Website Features

- Helpful resources for our referring physicians and their patients
- A complete back catalog of *Golden Hills Journal*
- Useful information about our great staff and state-of-the-art facility